In the Claims:

1.-11. (canceled)

12. (new) A rotational speed sensor, comprising:

a vibrating gyroscope arranged and dimensioned for receiving primary and secondary excitation signals and generating primary and secondary output signals;

a primary control loop arranged and dimensioned for amplifying the primary output signal, demodulating the amplified primary output signal, remodulating the demodulated primary output signal, and sending the demodulated primary output signal to said vibrating gyroscope as the primary excitation signal;

a secondary control loop arranged and dimensioned for amplifying the secondary output signal, demodulating the amplified secondary output signal, remodulating the demodulated secondary output signal, and sending the demodulated secondary output signal to said vibrating gyroscope as the secondary excitation signal;

a frequency synthesizer connected to the primary and secondary control and arranged and dimensioned for producing carriers for demodulation and remodulation and setting phases of the carriers in relation to one another, said carriers comprising a comparative carrier for said primary control loop; and

a phase comparison circuit arranged in said primary control loop for receiving the amplified primary output signal and the comparative carrier produced by said frequency synthesizer, said phase comparison circuit and frequency synthesizer forming a phase-locked loop.

13. (new) The rotational speed sensor of claim 12, wherein said primary control loop comprises a synchronous demodulator and a modulator and said carriers further comprise first and second carriers, said frequency synthesizer being arranged and dimensioned for supplying the first carrier to said synchronous demodulator and the second carrier to said modulator.

14. (new) The rotational speed sensor of claim 13, wherein said frequency synthesizer is arranged and dimensioned for applying a phase to the second carrier so that the phase rotation of said primary control loop including the vibrating gyroscope meets the resonance condition when said phase locked loop is locked.

15. (new) The rotational speed sensor of claim 14, wherein said frequency synthesizer is arranged and dimensioned for applying a phase to the first carrier that corresponds to that of the amplified output signal in the primary control loop.

16. (new) The rotational speed sensor of claim 13, wherein said carriers further comprise third through sixth carriers and said secondary control loop comprises first and second paths, each of said first and second paths having respective synchronous demodulators and modulators, wherein the third and fourth carriers are phase shifted through 90° with respect to one another and applied to respective synchronous demodulators in said first and second paths of said secondary control loop, and said fifth and sixth carriers are phase shifted through 90° with respect to one another and supplied to respective modulators in said first and second paths.

17. (new) The rotational speed sensor of claim 16, wherein said frequency synthesizer is arranged and dimensioned such that a phase difference between the phases of the third and fourth carriers and the phases of the fifth and sixth carriers is applied so that the resonance condition is met in said secondary control loop when said phase locked loop is locked, and the phases of the third to sixth carriers are arranged with respect to the comparative carrier such that a rotational speed signal which can be picked off from the synchronous demodulator in the first path via a filter adopts a maximum for a given rotation of the vibrating gyroscope.

18. (new) The rotational speed sensor of claim 12, further comprising a nonvolatile memory connected to said frequency synthesizer storing phase values stipulated by said frequency synthesizer in a previous trimming process, wherein the values stored in said

memory are readable by said frequency synthesizer when the rotational speed sensor is turned on.

19. (new) The rotational speed sensor of claim 18, wherein said frequency synthesizer is arranged and dimensioned for performing temperature-dependent phase correction of the carriers.

20. (new) The rotational speed sensor of claim 19, wherein said frequency synthesizer is arranged and dimensioned for using a change in the oscillation frequency of said vibrating gyroscope as a measure of the temperature change for performing the temperature-dependent phase correction.

21. (new) The rotational speed sensor of claim 19, wherein said nonvolatile memory stores temperature dependencies.

22. (new) A method for trimming a rotational speed sensor, said rotational speed sensor comprising a vibrating gyroscope arranged and dimensioned for receiving primary and secondary excitation signals and generating primary and secondary output signals, a primary control loop arranged and dimensioned for amplifying the primary output signal, demodulating the amplified primary output signal, remodulating the demodulated primary output signal, and sending the demodulated primary output signal to said vibrating gyroscope as the primary excitation signal, a secondary control loop arranged and dimensioned for amplifying the secondary output signal, demodulating the amplified secondary output signal, remodulating the demodulated secondary output signal, and sending the demodulated secondary output signal to said vibrating gyroscope as the secondary excitation signal, a frequency synthesizer connected to the primary and secondary control and arranged and dimensioned for producing carriers for demodulation and remodulation and setting phases of the carriers in relation to one another, said carriers comprising a comparative carrier for said primary control loop, and a phase comparison circuit arranged in said primary control loop for receiving the amplified primary output signal

and the comparative carrier produced by said frequency synthesizer, said phase comparison circuit and frequency synthesizer forming a phase-locked loop, said method comprising the steps of:

setting the phase of a carrier for a modulator in the primary control loop to meet a resonance condition of the primary control loop;

setting the phase of two carriers which are phase shifted through 90° with respect to each other for synchronous demodulators in the secondary control loop relative to the phase of another two carriers which are phase shifted through 90° with respect to each other for modulators in the secondary control loop for attaining a resonance condition in the secondary control loop; and

adjusting the phases of the carriers for the synchronous demodulators and the modulators in the secondary control loop relative to a comparative carrier when the vibrating gyroscope is set into rotation such that the rotational speed signal is at a maximum.